To: CN=Phil North/OU=R10/O=USEPA/C=US[]
Cc: []
From: CN=Michael Szerlog/OU=R10/O=USEPA/C=US
Sent: Wed 3/9/2011 9:46:03 PM
Subject: From the website that Matt LaCroix mentioned
Dudley W. Reiser
Charlotte Mackay

Phil,

May want to check this out.

Evaluating effects of potential flow modifications on fish habitats in the vicinity of the Pebble Project - Dudley W. Reiser, R2 Resource Consultants, Redmond, WA (co-authors: Chiming Huang and Stuart Beck - R2 Resource Consultants)
ABSTRACT
The development of the Pebble Project has the potential to affect the current hydrology of one or more of three watersheds in the project study area - the North Fork Koktuli River, South Fork Koktuli River, and Upper Talarik Creek. These effects may include temporal and spatial changes in the frequency, magnitude and duration of hydrologic conditions as well as rates of flow change. Changes in flow can influence the function of various salmonid life stages via alterations in both the quantity and quality of associated habitats. These changes could be beneficial or detrimental depending on their timing, magnitude, and location. This paper describes the results of baseline studies contracted by the Pebble Limited Partnership (PLP) to characterize the baseline relationships between flow and fish habitat and to evaluate potential effects of changes in flow on the fishery resources of the three study streams. This paper focuses on the mainstem portions of these systems. The primary method of analysis was patterned after the Physical Habitat Simulation (PHABSIM) method developed by the USFWS. Field data (depth, velocity and substrate) have been collected from 117 cross channel transects distributed within different habitat types located throughout the systems. We developed hydraulic models for each cross-section and linked these with Habitat Suitability Curve (HSC) criteria that define species and life stage habitat use to derive habitat-flow relationships for six target fish species. In addition, meso-habitat mapping was completed using a combined field and GIS-based approach for each system and resulted in the delineation of over 1800 habitat units. We then synthesized habitat – flow relationships for each habitat unit delineated. A computer model was developed using Microsoft Visual Basic and provides the platform for evaluating spatial and temporal changes in habitats resulting from flow modifications at the habitat unit scale. Sub-routines in the model allow for generation of predicted habitat gains and losses under different flow conditions by habitat type, stream reach, river, and all rivers combined scale. This model provides a powerful tool for evaluating fish habitats under baseline conditions, analyzing potential flow modification effects on those habitats, and for evaluating flow mitigation options.

Topic: HardRockMining

This one talks about macroinvertibrates being the "indicator" species.

Successful Coexistence of Mining and Fish - Charlotte Mackay, Manager, Permitting - Pebble Partnership, Anchorage, AK

ABSTRACT
Mining, using modern technology and careful environmental planning, can coexist with clean streams and a healthy fishery. This has been demonstrated at several mines in Alaska and recently in record Sockeye returns in Canada's Fraser River.

The Pebble Project is conducting some of the most extensive environmental baseline studies in the state's history. This robust data set will enable mine design and planning at Pebble that will provide for protection of the local fisheries. Studies include extensive fish surveys to understand which fish species are present, how they are distributed, the timing of their life cycles, and how they utilize habitat in the study area. Surface and groundwater hydrology studies are conducted to understand the flow regime in the rivers, lakes, and off-channel water bodies. Data are also collected to understand and model the relationship between changes in flow and the extent of usable fish habitat.

Understanding fish and their habitat is important in order to design for minimal impact, and to develop proactive fish mitigation strategies. However, fish and particularly salmon, with their migratory cycles, is not the most effective parameter to monitor a waterbody once operations have begun. Fish may not exhibit indicators of impact for several years; and for migratory species, linking cause and effect becomes complicated due to exposure to factors at sea and enroute to and from the spawning and rearing grounds in the study area. Changes in fish health and population size may be related to global warming, reduced populations of prey species at sea, marine pollution, fishing pressure or numerous other possibilities not easily distinguished from local factors. Macroinvertebrates and micro-organisms, however, have shorter life cycles, are resident to the area, and are highly sensitive to environmental change making them excellent indicator species for the local aquatic ecosystem. Pebble is developing a thorough baseline understanding of these organisms, along with water quality conditions, to set the platform for a strong, responsive, and effective monitoring program that in turn enables timely and effective mitigation should unexpected conditions arise.

Pebble studies set the stage for responsible mine design, proactive mitigation, monitoring, and response; the necessary ingredients to ensure a successful coexistence between mining and fish.

Topic: Other

Thanks

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